A: Datasheet

Algorithm: kneron_001

Developer: Kneron

Submission Date: 2021_06_10

Template size: 2048 bytes

Template time (2.5 percentile): 455 msec

Template time (median): 472 msec

Template time (97.5 percentile): 476 msec

Investigation:

Frontal mugshot ranking 192 (out of 279) –– FNIR(1600000, 0, 1) = 0.0295 vs. lowest 0.0009 from sensetime_005

Mugshot webcam ranking 233 (out of 241) –– FNIR(1600000, 0, 1) = 0.6209 vs. lowest 0.0062 from sensetime_005

Mugshot profile ranking 28 (out of 210) –– FNIR(1600000, 0, 1) = 0.2369 vs. lowest 0.0587 from xforwardai_002

Immigration visa–border ranking 127 (out of 168) –– FNIR(1600000, 0, 1) = 0.1441 vs. lowest 0.0013 from visionlabs_010

Immigration visa–kiosk ranking 112 (out of 165) –– FNIR(1600000, 0, 1) = 0.2797 vs. lowest 0.0568 from cloudwalk_hr_000

Identification:

Frontal mugshot ranking 278 (out of 279) –– FNIR(1600000, T, L+1) = 0.9998, FPIR=0.001000 vs. lowest 0.0018 from sensetime_004

Mugshot profile ranking 187 (out of 209) –– FNIR(1600000, T, L+1) = 0.9999, FPIR=0.001000 vs. lowest 0.1331 from cloudwalk_hr_000

Immigration visa–border ranking 162 (out of 167) –– FNIR(1600000, T, L+1) = 1.0000, FPIR=0.001000 vs. lowest 0.0047 from idemia_008

Immigration visa–kiosk ranking 154 (out of 162) –– FNIR(1600000, T, L+1) = 1.0000, FPIR=0.001000 vs. lowest 0.0996 from cloudwalk_hr_000

B: Mugshot natural images, identification mode: FNIR(N, L+1, T) vs. most accurate (sensetime_004)
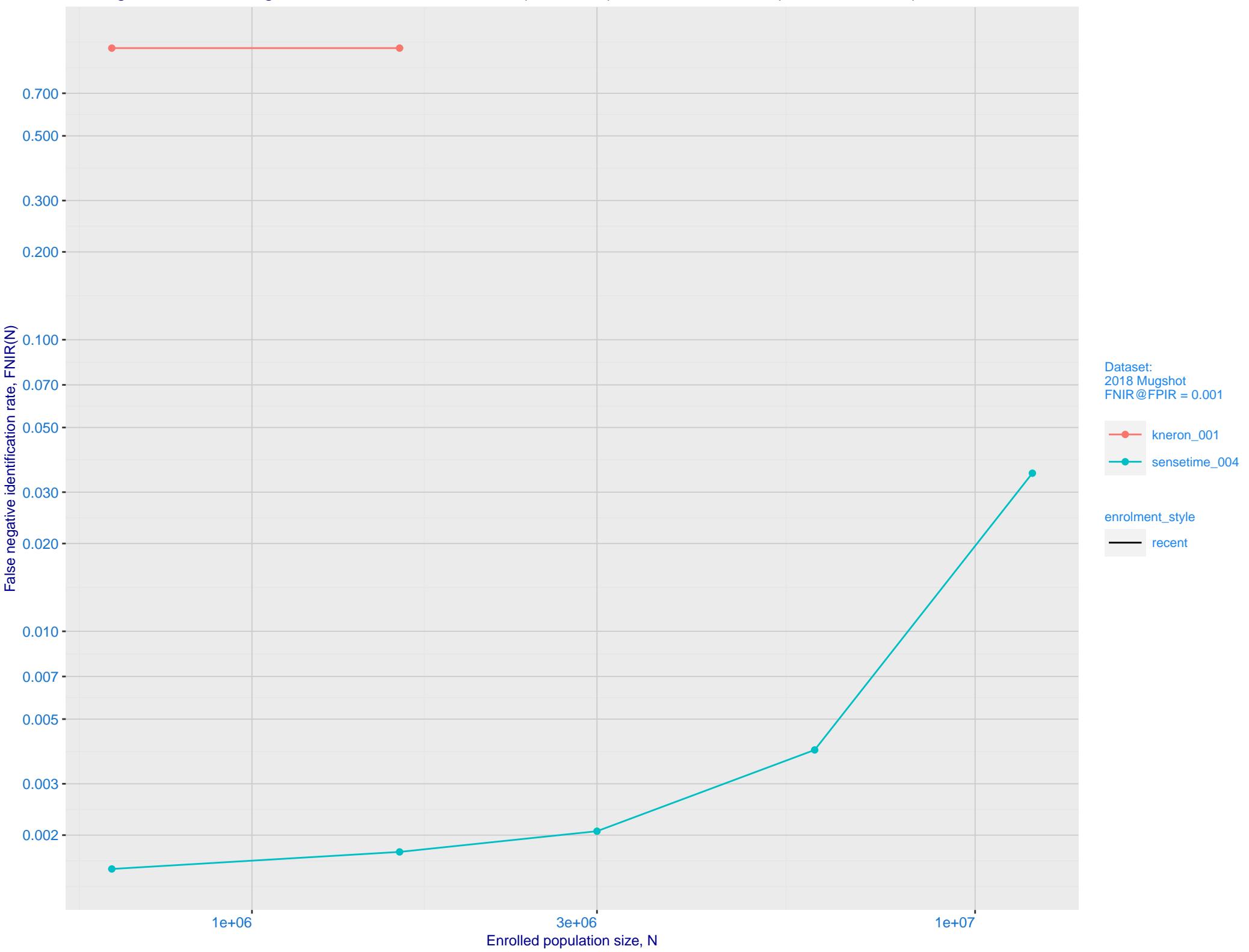
C: Evolution of accuracy for KNERON algorithms on three datasets 2018 – present
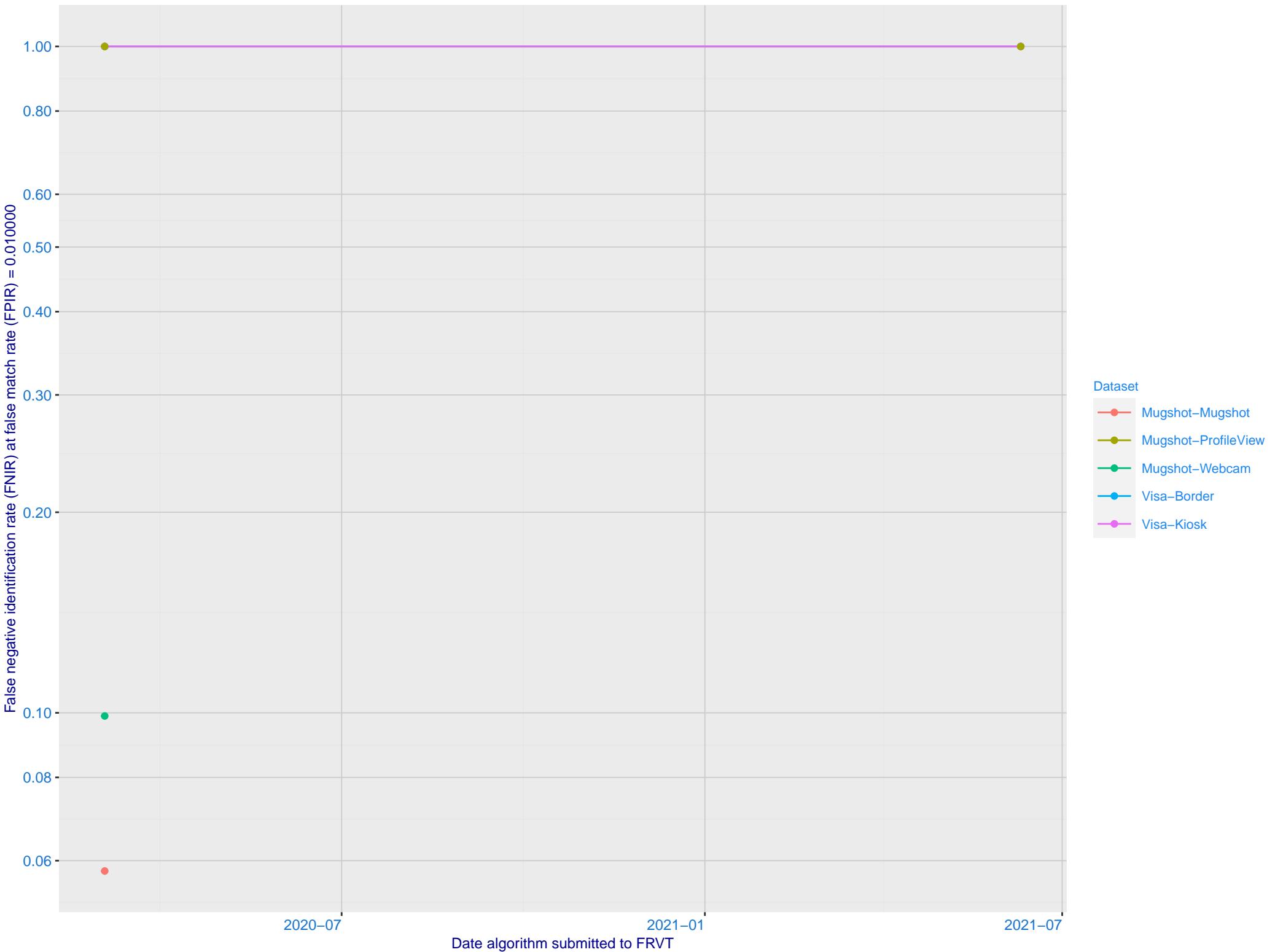
D: 1:N error tradeoff by dataset and enrollment type. N = 1600000 individuals
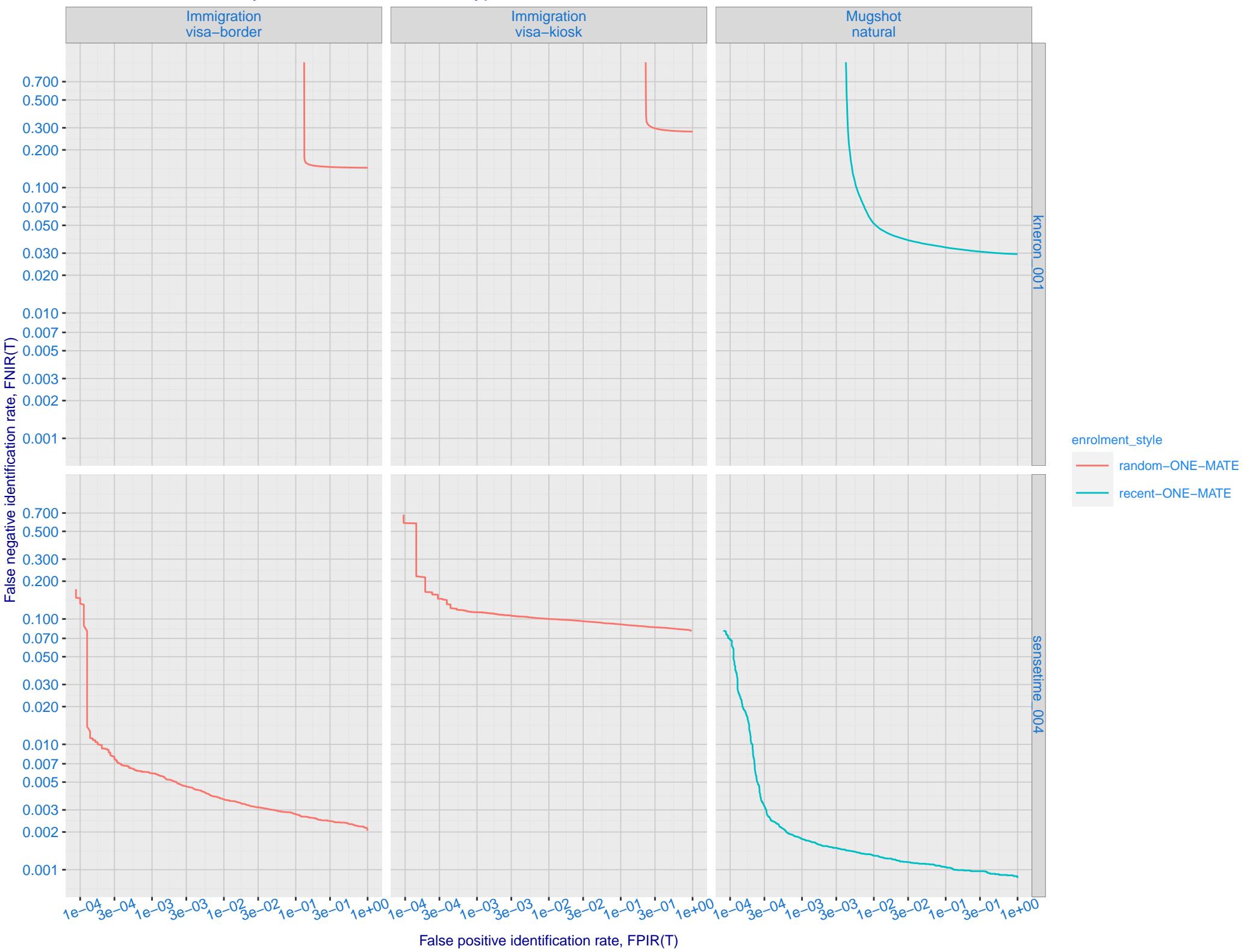
E: Dependence of error rates on T by number enrolled identities, N, for Mugshot natural images
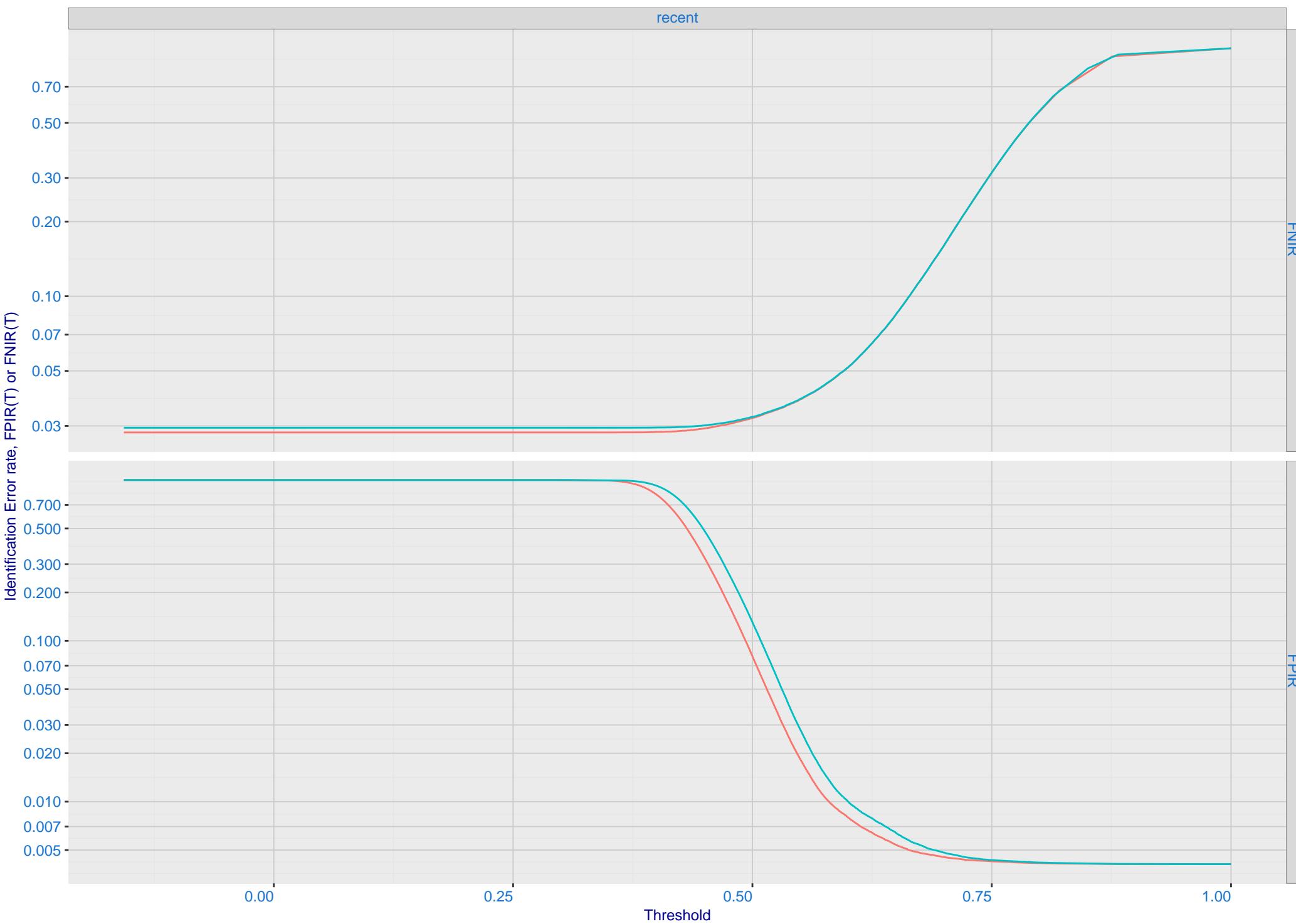
F: FPIR vs. Selectivity for mugshot images, N = 1600000 subjects enrolled with one recent mate
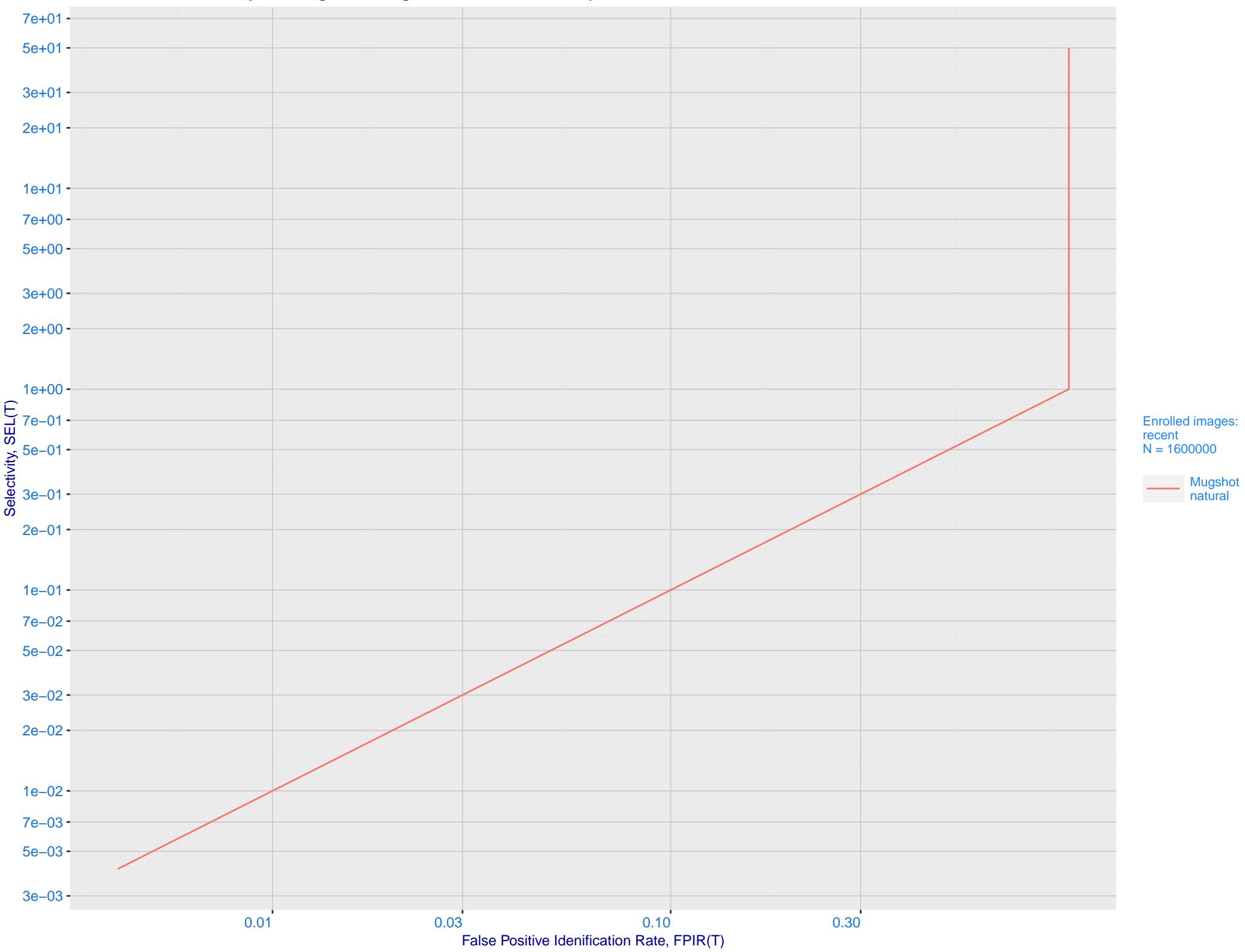
G: FPIR dependence on T by probe type for N = 1600000 subjects
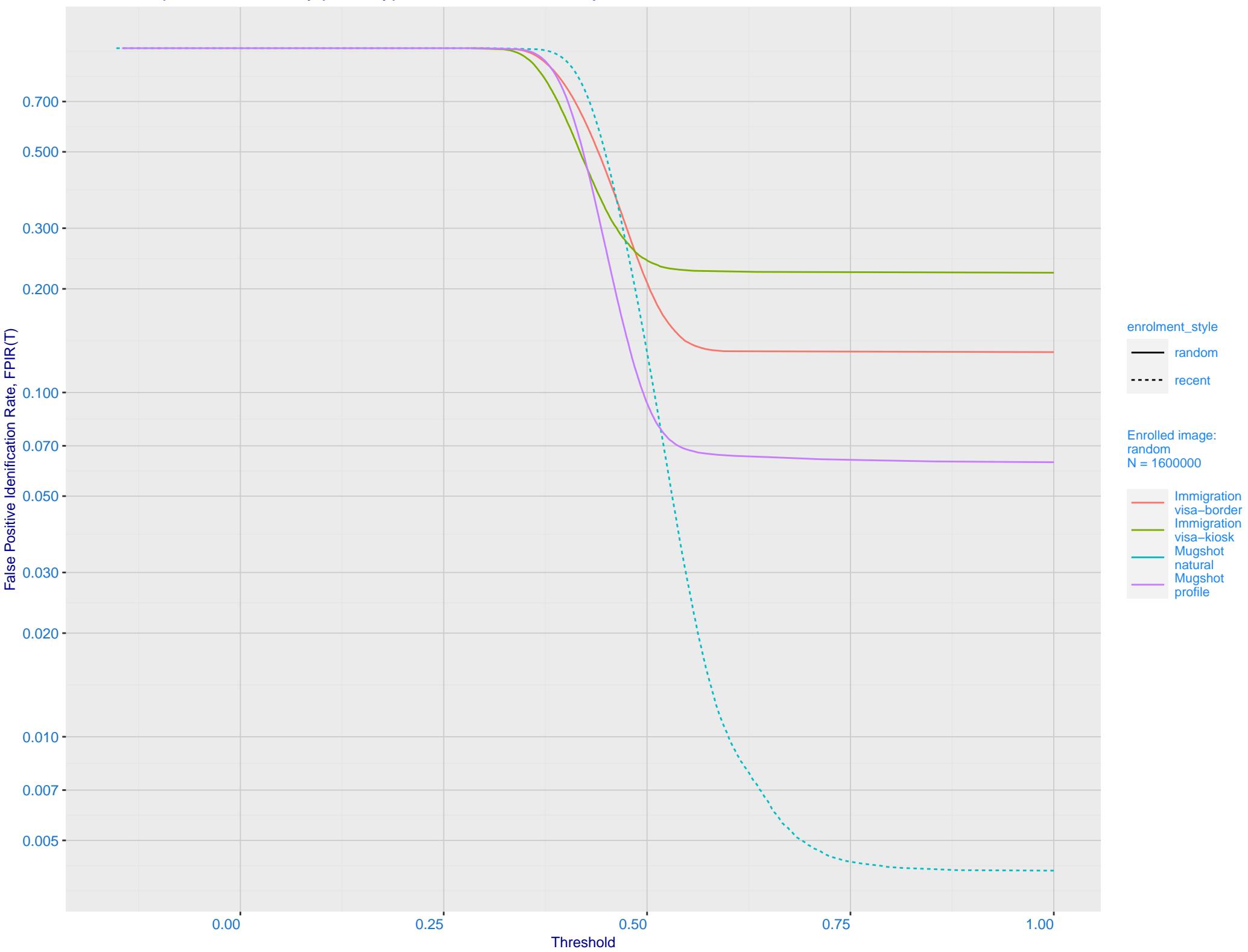
H: Reduced length candidate lists for human review
Dataset is border−border with time−lapse [10,15] YRS with N = 1600000. Probes are 10−15 years later than enrollment image


Mated

without threshold, all lists have same length, here 50

with low threshold, list length shortens
towards 1 as there is 1 mate

at high threshold, lists
gradually get shorter as mates
fall below threshold (misses)

the pink region shows
[5,95]−percentile of list lengths

Non−Mated

without threshold, all lists have same length, here 50

with low threshold, list length shortens

at high threshold, lists only rarely
have any candidates
here only 1 in 100

Mean candidate list length

Threshold value

I: FNIR and FPIR dependence on threshold
Dataset is border–border with time–lapse [10,15] YRS with N = 1600000. Probes are 10–15 years later than enrollment image
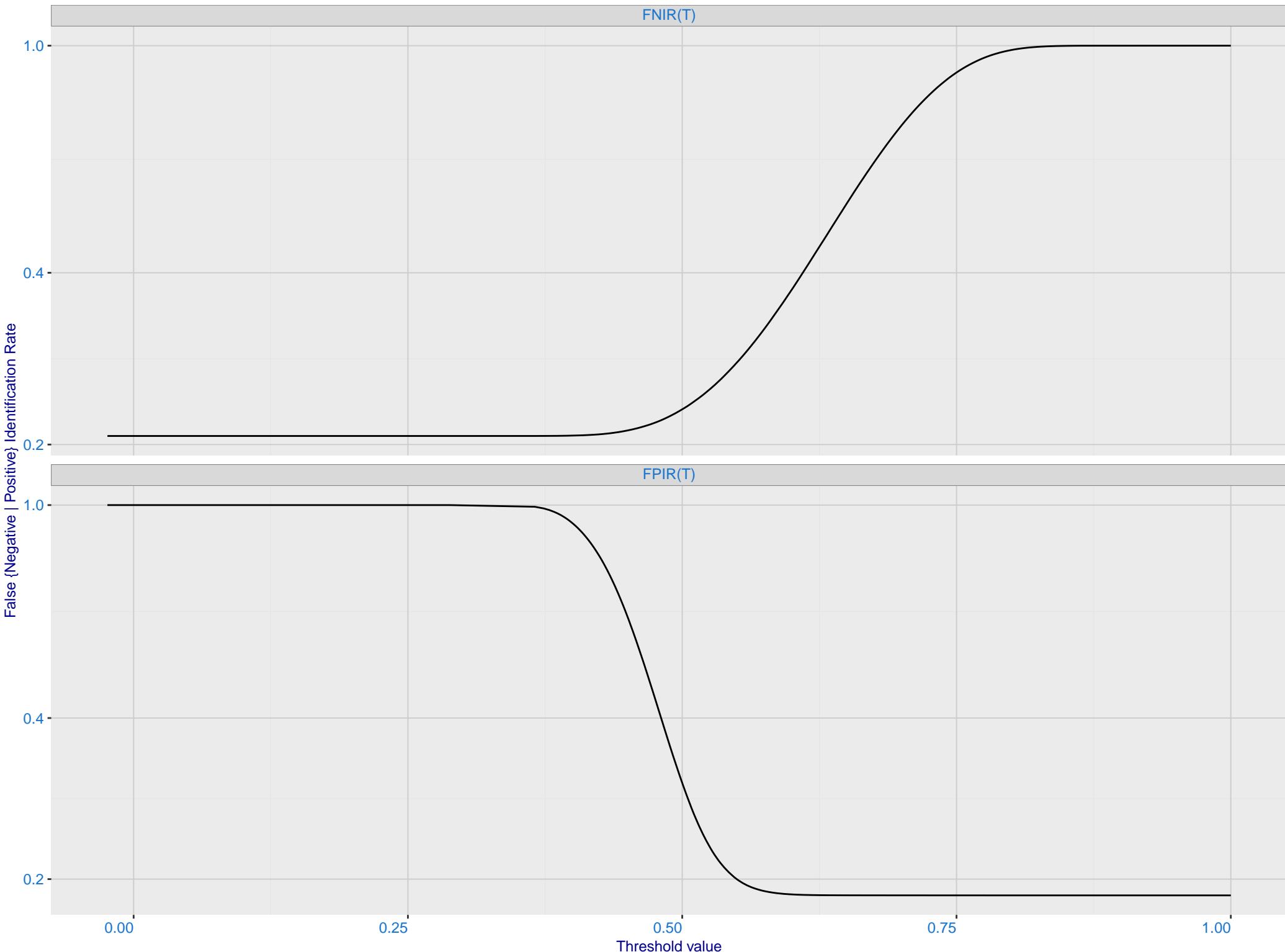
J: DET for Mugshot natural images and various N. Links connect points of equal threshold.
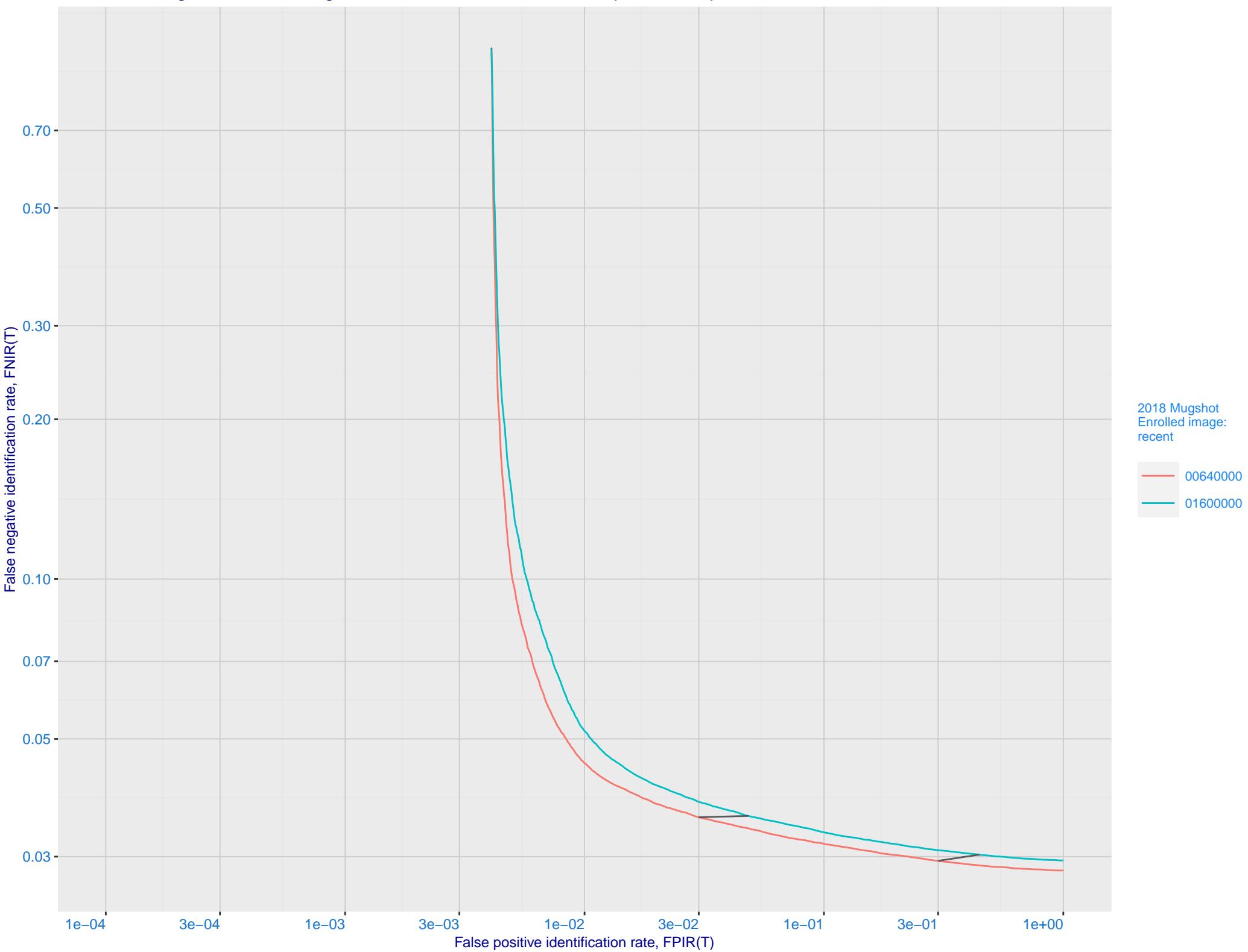
K: Investigational mode: FNIR(N, 1, 0) vs. most accurate (sensetime_005)
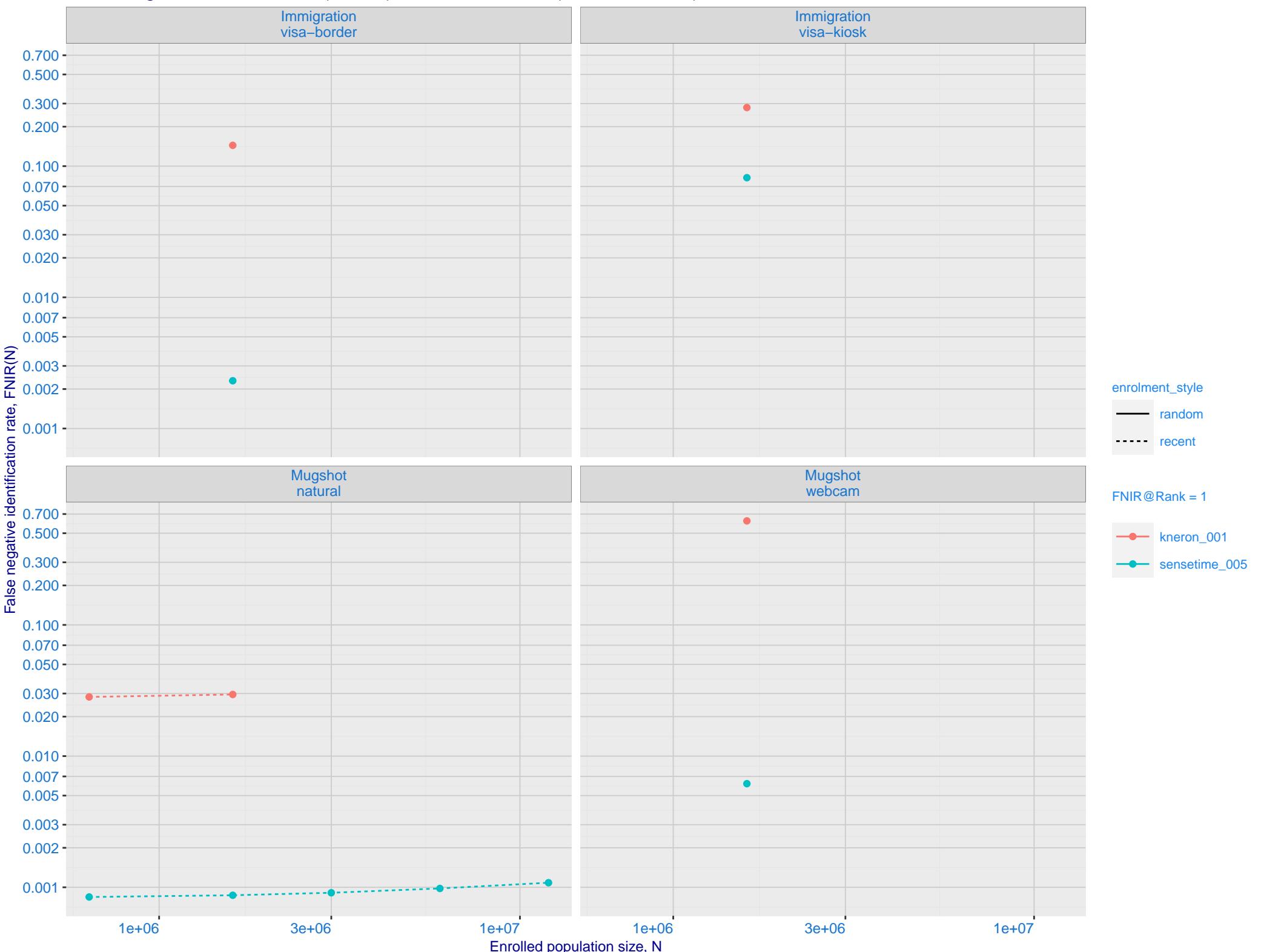
L: Investigational mode: FNIR(1600000, R, 0) by probe type
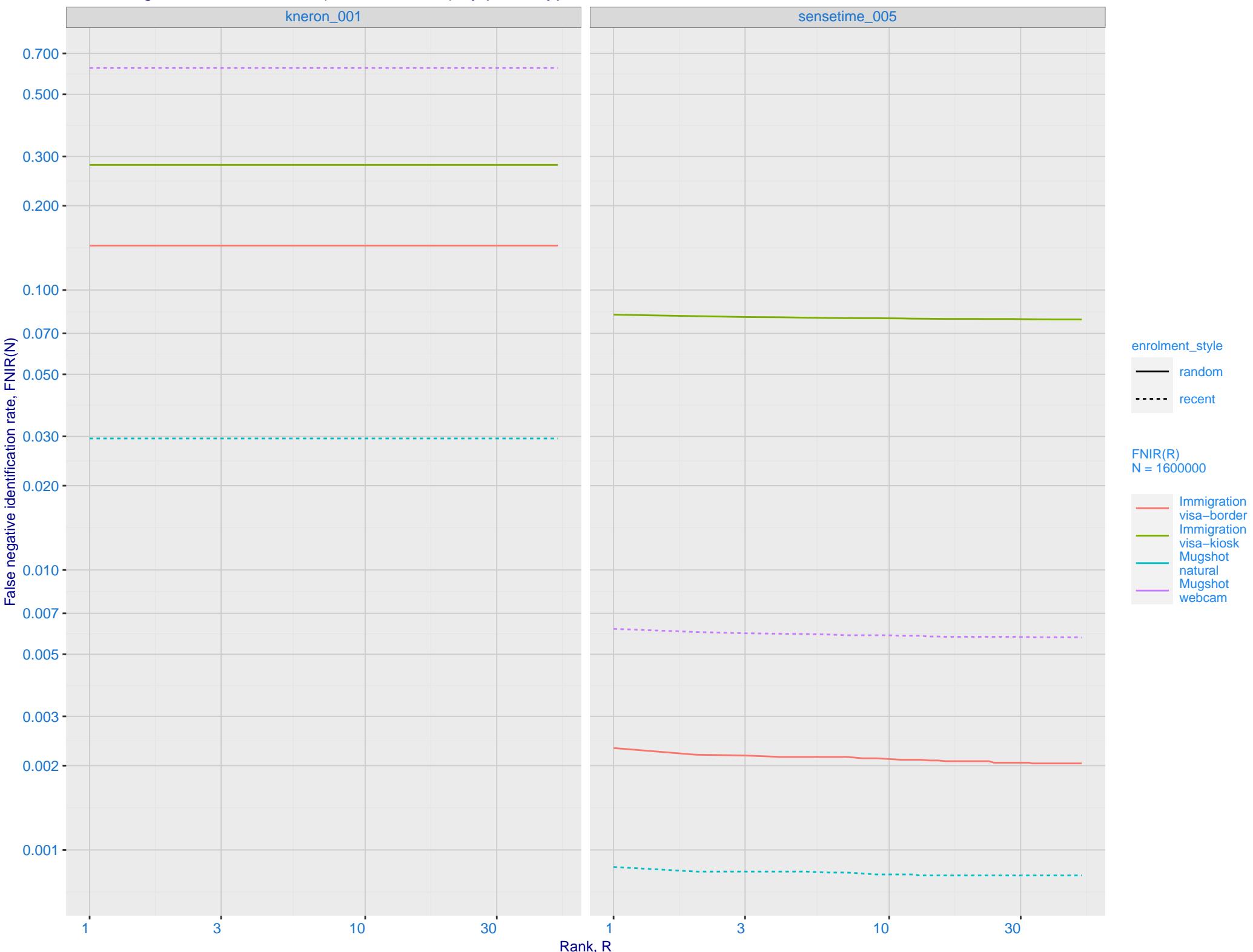
M: Template duration; search duration vs. N. The blue and pink ribbon covers 95 percent of observed measurements. The template generation time is independent of N. The log and power−law models are fit to the first two (N,T) observations
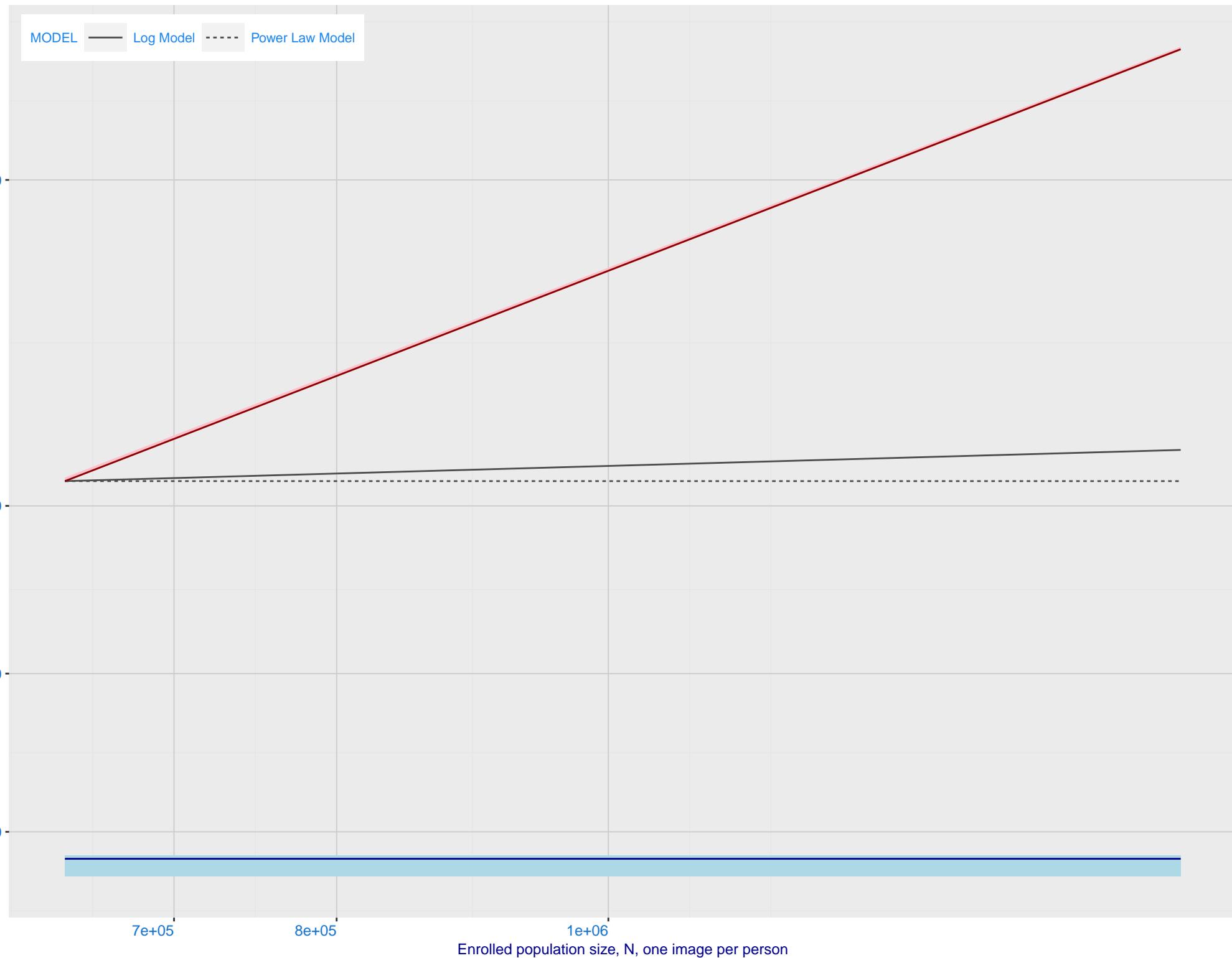
O: FNIR(T, N = 1.6 million) by sex, age and time−lapse. The top row gives investigational rank−1 miss rates.
The bottom panels give high threshold for more lights−out identification with low FPIR.

Algorithm: kneron_001, Dataset: Border−Crossing Ageing N = 1600000
Text encodes FNIR, Color encodes log(FNIR)

−3   −2   −1   0

Female | **Male**

FNIR(R=1, T=0)

| Age group	10	11	12	13	14	15		10	11	12	13	14	15
(60:99]	0.214	0.212	0.212	0.219	0.251	0.246		0.194	0.185	0.180	0.196	0.228	0.250
(45:60]	0.209	0.206	0.206	0.216	0.250	0.269		0.168	0.171	0.169	0.174	0.216	0.217
(30:45]	0.221	0.219	0.218	0.228	0.266	0.280		0.169	0.163	0.165	0.167	0.212	0.216
(21:30]	0.229	0.232	0.239	0.246	0.287	0.306		0.165	0.169	0.171	0.171	0.210	0.230
(18:21]	0.235	0.234	0.244	0.254	0.284	0.299		0.170	0.167	0.168	0.172	0.206	0.206
(15:18]	0.269	0.252	0.252	0.271	0.299	0.329		0.216	0.201	0.211	0.228	0.261	0.279
(12:15]	0.307	0.286	0.274	0.276	0.362	0.312		0.298	0.280	0.292	0.303	0.329	0.341

FNIR(R=50, T=1.000000), FPIR(30−45, Male) = 0.001

Age group	10	11	12	13	14	15		10	11	12	13	14	15
(60:99]	1.000	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
(45:60]	1.000	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
(30:45]	1.000	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
(21:30]	1.000	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
(18:21]	1.000	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
(15:18]	1.000	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
(12:15]	1.000	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000

Age group at time of enrollment

Time between probe and enrollment (years)

P: FPIR(N = 1.6 million) by sex and age. It is typical for false positive identification rates to be higher in women except in their teens.

Algorithm: kneron_001, Dataset: Border−Crossing Ageing
Threshold: 1.000000 set to achive FPIR(30−45, Male) = 0.001

Color encodes log(FPIR)

−4   −3   −2   −1

Age group	Female	Male
(60:99]	0.1731	0.1743
(45:60]	0.1967	0.1833
(30:45]	0.2182	0.1793
(21:30]	0.1900	0.1626
(18:21]	0.1774	0.1561
(15:18]	0.2014	0.1835
(12:15]	0.2036	0.2112

Age group of person in non−mate probe
(The age of the highest non−mates will usually be similar to that of the probe.)

Sex of person in non−mate probe
(The sex of the highest non−mates will usually be that of the probe.)

Q: Identification FNIR(N, T, L+1) and Investigational FNIR(N, 0, R) under ageing